

CLAIMS

1. A powdered medicine multi-dose administering device comprising:

means for defining a medicine storage chamber (5a) capable of storing a multi-dose amount of powdered medicine;

a medicine container unit (5b) provided under the bottom surface of said medicine storage chamber (5a) and is capable of containing a single-dose amount of powdered medicine;

a medicine guiding unit (2) capable of moving between a filling position and an administering position while remaining in contact with the bottom surface of said medicine storage chamber (5a), and, when moved to the filling position, causes said medicine container unit (5b) to be opened to said medicine storage chamber (5a) through opening means (2f) and, when moved to the administering position, causes said medicine container unit (5b) to be closed with respect to said medicine storage chamber (5a) and causes said medicine container unit (5b) to be communicated with the exterior of the device through a pipe (2g, 2d);

means (13) communicated with a hole (5c) formed in the bottom surface of said medicine storage chamber (5a) and moves said medicine guiding unit (2) between the filling position and the administering position; and

a pump unit (3) capable of blowing the air into said medicine container unit (5b) through a filter (6a) provided in the bottom of said medicine container unit (5b); wherein

said medicine guiding unit (2), at the filling position, enables said medicine container unit (5b) to be filled with the powdered medicine from said medicine storage chamber (5a) through said opening means and, at this moment, said hole (5c) is located at a position where said pump unit (3) is communicated with

the exterior through said pipe (2g, 2d); and

said medicine guiding unit (2), at the administering position, permits the powdery medicine in said medicine container unit (5b) to be injected out of the device together with the air through said pipe (2g, 2d) while closing said hole (5c) without joining it to said opening means (2f).

2. A powdered medicine multi-dose administering device according to claim 1, wherein said medicine storage chamber (5a) and said medicine container unit (5b) are molded integrally together by using a resin to define a body of the device (1).

3. A powdered medicine multi-dose administering device according to claim 1, wherein said medicine guiding unit (2) includes a lower disk-like portion and a pole-like portion extending upward from the disk-like portion, which are integrally molded together using a resin, said opening means (2f) is so formed as to penetrate vertically through the disk-like portion, and said pipe (2g, 2d) is opened at its one end in the lower surface (2e) of the disk-like portion and is opened at its other end in the upper end of the pole-like portion.

4. A powdered medicine multi-dose administering device according to claim 3, wherein said device body (1) is nearly of a cylindrical shape, the disk-like portion of said medicine guiding unit (2) has a diameter smaller than the inner diameter of the medicine storage chamber (5a) of said device body, and the medicine guiding unit (2) is allowed to rotate between the filling position and the administering position over a predetermined angular range.

5. A powdered medicine multi-dose administering device according to claim 1, wherein said device body (1) has a closure unit (4) on the medicine storage unit (5a), said closure unit has a shaft hole (11) at the center thereof for passing through the pole-like portion of said medicine guiding unit (2), and said medicine storage

chamber (5a) is sealed with said the closure unit, said medicine storage unit (5a) and said medicine guiding unit (2).

5 6. A powdered medicine multi-dose administering device according to claim 5, wherein said bottom surface (2e) of the disk-like portion of said medicine guiding unit (2) comes in contact with the bottom surface of said medicine storage chamber (5a), the upper and lower positions of said medicine guiding unit (2) are limited by a contact portion (10) formed on said pole-like portion so as to come into contact with the inner surface of the closure unit (4), and the bottom surface (2e) of the disk-like portion of said medicine guiding unit (2) is brought into intimate contact with the bottom surface of said medicine storage chamber (5a).

10 7. A powdered medicine multi-dose administering device according to claim 6, wherein said medicine guiding unit (2) has a shaft (2j) of a circular shape in cross section formed in the upper part of said junction portion (10) of the pole-like portion so as to be fitted to the shaft hole of said closure unit (4), and has a shaft (2k) of a non-circular shape in cross section formed in the upper part thereof, the means operated from the outer side of the device to move the medicine guiding unit (2) between the filling position and the administering position, is a rotary spray metering change-over device (13) which has a non-circular hole (13c) that fits to the shaft (2k) of a non-circular shape in cross section of the pole portion of said medicine guiding unit (2), and said medicine guiding unit (2) moves between the filling position and the administering position being interlocked to the rotational operation of said change-over device (13).

20 8. A powdered medicine multi-dose administering device according to claim 7, wherein the shaft (2k) having the non-circular shape in cross section and the non-circular hole (13c) fitted thereby, have a home base-

like pentagonal shape in cross section.

5 9. A powdered medicine multi-dose administering device according to claim 7, wherein said rotary spray metering change-over device (13) includes a cylindrical portion (13a) having a large diameter and a cylindrical portion (13b) having a small diameter, that are molded integrally together using a resin, the outer periphery of the cylindrical portion having a large diameter forms a rotary operation portion, and the cylindrical portion of 10 a small diameter defines a powdered medicine passage (2c) formed therein, has the non-circular hole (13c) formed in the base portion, and defines a spray port in an end (2h) thereof.

15 10. A powdered medicine multi-dose administering device according to claim 7, wherein said rotary spray metering change-over device (13) is formed to be detachable from said device body (1) and said medicine guiding unit (2).

20 11. A powdered medicine multi-dose administering device according to claim 3, wherein a central hole (14) is formed at the center in the bottom surface (2e) of the disk-like portion of said medicine guiding unit (2), and a protuberance (8) is formed at the center on the bottom surface of said medicine storage chamber (5a) to work as 25 a shaft that fits to the central hole (14) in order to stabilize the turning of said medicine guiding unit (2).

30 12. A powdered medicine multi-dose administering device according to claim 4, wherein said rotary spray metering change-over device (13) has an arcuate groove (13d) formed in the upper surface of said cylindrical portion (13a) of the large diameter with said non-circular hole (13c) as a center, said closure unit (4) has a protuberance (4a) formed on the upper surface thereof so as to be inserted in said arcuate groove (13d) 35 thereby to limit the rotation of said medicine guiding unit (2) and of said rotary spray metering change-over device (13), wherein, when said protuberance (4a) is

located at an end of said arcuate groove (13d), the position for filling the powdered medicine is limited and, when said protuberance (4a) is located at the other end, the position for administering the powdered medicine is limited.

13. A powdered medicine multi-dose administering device according to claim 4, wherein an angle (x) subtended by the center of said opening means (2f) and the center of the opening of said pipe (2g) on the bottom surface of the disk-like portion of said medicine guiding unit (2), is equal to, or is slightly smaller than, an angle (y) subtended by one end and other end of the arcuate groove (13d) in the upper surface of the cylindrical portion (13a) of the large diameter from the center of said non-circular hole (13c) of said rotary spray metering change-over device (13) ( $x \leq y$ ), and is from 60 degrees to 180 degrees.

14. A powdered medicine multi-dose administering device according to claim 2, wherein the disk-like portion of said medicine guiding unit (2) on the side of the medicine storage chamber (5a) is inclined upward from the periphery toward the center at an angle ( $\alpha$ ) in a range of from 15 degrees to 45 degrees with respect to the bottom surface (2e) of the disk-like portion.

15. A powdered medicine multi-dose administering device according to claim 2, wherein said pipe (2g) provided in the medicine guiding unit (2) is inclined upward at angles ( $\beta$ ,  $\gamma$ ) in a range of from 20 degrees to 70 degrees with respect to the bottom surface (2e) of said medicine guiding unit (2).

16. A powdered medicine multi-dose administering device according to claim 1, wherein said opening means (2f) in said medicine guiding unit (2) is a hole (2f) penetrating vertically through the disk-like portion.

17. A powdered medicine multi-dose administering device according to claim 16, wherein said opening

means (2f) extends upward from the opening in the bottom surface (2e) of the disk-like portion, and forms a pocket-like dent (2m) on the side facing said medicine storage chamber (5a), said dent (2m) assisting a smooth conveyance of the powdered medicine in the medicine storage chamber (5a) into the medicine container chamber (5b) during the operation for changing over the filling and administering.

18. A powdered medicine multi-dose administering device according to claim 4, wherein one or plural pieces of vanes (21) are formed on the outer side of said pole-like portion of said medicine guiding unit (2), so that the powdered medicine in the medicine storage chamber (5a) is stirred as the medicine guiding unit (2) moves between the filling position and the administering position.

19. A powdered medicine multi-dose administering device according to claim 1, wherein said pump unit (3) is at least partly constituted by a flexible resin so as to define an air chamber therein, the opening portion of said pump unit (3) is coupled to the lower part of the device body (1), the pump unit (3) is depressed and relaxed to blow the air into said medicine container chamber (5b) through said filter (6) in the air chamber, and the powdered medicine is blown out of the device through said pipe (2g, 2d, 2c).

20. A powdered medicine multi-dose administering device according to claim 1, wherein said filter (6) has a recessed portion or a protruded portion on the side facing said medicine container chamber (5b) to adjust the volume of said medicine container chamber (5b).

21. A powdered medicine multi-dose administering device according to claim 1, wherein said medicine guiding unit (2) is obtained by molding one or more kinds of high-molecular materials selected from the group consisting of a polycarbonate, ABS, a high-impact polystyrene and a cyclic olefin copolymer.

22. A powdered medicine multi-dose administering device according to claim 1, wherein a drying agent is mounted on a portion of the device.

23. A powdered medicine multi-dose administering device according to claim 1, wherein said powdered medicine multi-dose administering device is disposable.

24. A powdered medicine multi-dose administering device according to claim 1, wherein said powdered medicine multi-dose administering device is for administering the medicine into the body cavity.

25. A powdered medicine multi-dose administering device according to claim 1, wherein said powdered medicine multi-dose administering device is for administering the medicine into the nasal cavity.

26. A powdered medicine multi-dose administering device according to claim 1, wherein said powdered medicine multi-dose administering device is for administering the medicine into the lung.

27. A powdered medicine multi-dose administering method, wherein a medicine container unit (5b) capable of containing a powdered medicine of a unit-dose amount is provided under the bottom surface of a medicine storage chamber (5a) capable of storing the powdered medicine of an amount of many times of administering operation, a medicine guiding unit (2) is provided to move between a filling position and an administering position while maintaining a contact with the bottom surface of said medicine storage chamber (5a) so that, when moved to the filling position, said medicine container unit (5b) is opened to said medicine storage chamber (5a) through opening means (2f) and, when moved to the administering position, said medicine container chamber (5b) is closed with respect to said medicine storage chamber (5a) and is communicated with the exterior of the device through a pipe (2g, 2d), and a hole (5c) is formed in the bottom surface of said medicine storage chamber (5a);

said medicine guiding unit (2) is moved

between the filling position and the administering position, so that:

5           at the filling position, said medicine container unit (5b) is filled with the powdered medicine from said medicine storage chamber (5a) through said opening means and, at the same time, said hole (5c) is pneumatically connected to the pump unit (3) through said pipe (2g, 2d);

10           the powdered medicine in said medicine container unit (5b) is swept and metered into an amount of one time of administering operation as said medicine guiding unit moves from the filling position to the administering position; and

15           at the administering position, the pump (3) is operated to blow the air into said medicine container unit (5b) through the filter (6) to inject the powdered medicine out of the device through said pipe (2g, 2d, 2c).

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